

## On National Income<sup>1</sup>

### *Introduction*

Comprehensive systems of national accounts consist today of traditional national income, expenditure and product accounts, input output or production accounts, financial transactions and revaluation accounts<sup>2</sup> and national balance sheets. While many parts of this modern system are expressed in current and constant prices, national income, its factor and individual income distributions are meaningfully only expressed in current prices. Constant price, or ‘quantity’, indexes are used to measure ‘real’ expenditures overtime and across nations, in productivity studies both partial and for all factors again over time and across industries and countries<sup>3</sup>. Indeed, much of modern economic history can now be written in terms of the nominal and real economic accounts over time.

Yet, to date no one has put together a comprehensive examination of the whole accounting system seen from a particular set or sets of economic theory. Theorists, such as J. R. Hicks, Richard Stone, Wassily Leontief and James Meade and quantitative economic historians such as Simon Kuznets have made notable contributions to National Accounting and have been so recognized with Nobel Prizes. The general lack of emphasis on the connection with economic theory, however, causes the poor student of economics to find the structure of the official accounts

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<sup>1</sup> I am indebted to Dr. Harry Postner, with whom I collaborated in preparing a paper at a session we organized on ‘National Accounts and the teaching of economics’ at the 1998 meetings of the IARIW and for his continued criticisms of my work. The most dispiriting finding of that session was how few Departments around the world maintained courses in national accounting as part of their curricula. I think the reason is that official national accounting has too little emphasis on connecting with modern economic theories and they accordingly lose too much academic contact. I alone am responsible for this basic theme in this paper. I also record with much gratitude the extremely critical and penetrating comments on the initial draft of this paper made by Professor Duncan McDowall of the History Department at Carleton. Professor McDowall took valuable time away from writing a history of the Canadian National Accounts to comment on my paper. I am also much obliged to Professor Mark Bils whose suggestion for tightening the paper was useful indeed.

<sup>2</sup> See my “National accounting and financial flows” in eds. P. Newman et al., **THE NEW PALGRAVE DICTIONARY OF MONEY AND FINANCE**, III (London: Macmillan, 1992)

<sup>3</sup> For a discussion of price and quantity indexes by the world’s foremost authority on them, see W.E. Diewert’s contributions to the Consumer Price Index Manual: Theory and Practice (Geneva, ILO, 2004) and Producer Price Index Manual: Theory and Practice (Washington, IMF, 2004)

a bewildering maze of "uses and resources", which seem more the product of much worthwhile international compromise than the development of the accounts from basic principles of economic theory. Anyone who has tried to teach economics students with the System of National Accounts [or SNA] 1993 [Washington, D.C., Commission of the European Communities; International Monetary Fund; OECD; United Nations; and the World Bank. [sic]] will not find in all the bureaucratic compromises of admittedly needed reconciliation and international comparisons those flashes of illumination which economic theories can give. So it is sad to read one of the best practitioners of National Accounting today asserting "...the conceptual foundations of the present model of the national accounts are being progressively undermined by the shifting quicksands of economic theory..."<sup>4</sup> Of course, Ward describes other eroding forces but to give economic theory priority of place in conceptually undermining the Accounts seems to me an error resulting from a despairing denigration of economic theory.

In this essay I concentrate on how economic theory contributed to and conditioned national income accounting developments and to some extent how problems in constructing national accounts condition good economic theory. The central theme of this essay then is the interplay between economic theory and national income accounting. Modern readers, especially students, once they see the interconnection between the accounts and economic theory, should, I hope, find the National Accounts as fascinating and exciting as I do and will become "...passionate accountants."

### *Classical and neoclassical national income theories*

David Ricardo<sup>5</sup> argued the principal problem of political economy was the determination of the laws governing the distribution of national income among the classes of society. His question was a major concern of classical economic theorists and it has returned to some preeminence among economists today.<sup>6</sup>

Consider the following set of extremely simple national income and expenditure accounts set out for a market economy to examine classical economic theory.

Incomes	Expenditures
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<sup>4</sup> Michael Ward, "An intellectual history of national accounting: A review of Andre Vanoli, A History of National Accounting", *Review of Income and Wealth*, LII, June 2006, 327

<sup>5</sup> See David Ricardo, *On the Principles of Political Economy and Taxation*, ed. Piero Sraffa, **THE WORKS AND CORRESPONDENCE OF DAVID RICARDO**, I, (Cambridge: At the University Press, 1971), 5

<sup>6</sup> See, for instance, Branko Milanovic, **WORLDS APART: Measuring international and global inequality** [Princeton: Princeton University Press, 2005]

$$\begin{array}{ccc}
 \begin{array}{l}
 \text{WL} \\
 \text{RP}_K K \\
 \text{RP}_N N \\
 \text{D}_N \text{P}_N N \\
 \\
 \text{D}_K \text{P}_K K \\
 \hline
 \text{Y}
 \end{array}
 & \equiv &
 \begin{array}{l}
 \text{PcC} \\
 \text{P}_{K\Delta} K \\
 \\
 \\
 \\
 \\
 \hline
 \text{E}
 \end{array}
 \end{array}$$

where National Income, Y, is shown as identically equal to National Final Expenditures, E.<sup>7</sup>

The notation involves the income of workers, WL, with W the set of money<sup>8</sup> wage rates and

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<sup>7</sup> Examining the accounts for one country among many, one must distinguish between National Income and Domestic Product. Some economists regard the Domestic Product concept as more useful since it extract from effects of the international redistribution of returns to capital. For a contrary opinion see Wilfred Beckerman, "National income", eds. John Eatwell et al., **THE NEW PALGRAVE DICTIONARY OF ECONOMICS**, III (Toronto: Macmillan, 1987), 590-2. More technical but telling objections can be raised against the Domestic concept when it is expressed in constant price terms in a world in which international trade takes place in intermediate inputs of production.

Why however, does Y equal E? If we imagine the accounts were for an even simpler world where there was no capital, then the equality among the circular flows would be clear. Owners of labour would sell their time to producers and the value of their expenditures for the goods produced would cover the cost of the producers. For an extensive discussion of circular flows, see Charles Hulten, "The 'architecture' of capital accounting: basic design principles", eds Dale Jorgenson et al., **A NEW ARCHITECTURE FOR THE U.S. NATIONAL ACCOUNTS** (Chicago: University of Chicago Press for the NBE, 2006)

<sup>8</sup> Sometimes, when legal market prices do not exist, the national accountant, to prevent 'undue' fluctuations in measured national income, will impute market prices to transactions otherwise unpriced. The classic now quaint example attributed to Professor Pigou is the decline in national income which would occur when a man marries his housekeeper. Similar imputations are made for changes in dwellings between tenant and owner occupied status. 'Illegal' prices are not used in national accounts except when the failure to do so involves severe measurement problems. The most recent example occurred when the government of Greece incorporated illegal earnings associated with the 'underground' economy to raise its national income to meet the European Union's requirement of acceptable ratios of government deficits to national income. The choices of consumers of the use of market, 'illegal' or otherwise, prices should be considered sacrosanct in general by the national accountant and the use of imputations should be rare and carefully explained. The behaviour of the Greek government, reflects not so much the failure of the national accounts to reflect income associated with the underground economy as the ludicrous use of

L the corresponding set of the working times (hours, days, etc) offered and demanded by the suppliers and demanders of labour;  $RP_N$  are the net rents earned by the natural agents of production, which, for illustrative purposes, we shall take mainly to be the inalienable and inexhaustible powers of the soil, where  $R$  are net rates of return,  $P_N$  are prices of the stocks of land so that  $RP_N$  are the net rents on the stocks of land,  $N$ ; and  $RP_K$  are rentals earned by the stocks,  $K$ , of reproducible capital goods like machines, inventories and buildings. Inanimate things like land and capital goods earn nothing by themselves and clearly what the classical economists had in mind when then they wrote of the factoral distribution of income was that the net rents on land were garnered by land owners, and the net rents being earned by capital was the net flow of income being earned by the owners of the capital goods, capitalists playing their rentier roles as savers and holders of the stock of capital in the economy. By the factoral distribution of income classical economists meant the distribution of income among people, aggregated as the classes of society: labourers, landlords and capitalists. When it is borne in mind that the classical economists also saw labour, land and capital as factors of production, classical theoretical economics was an immensely great scientific undertaking, one which still echoes throughout economics today.

The entries  $D_N P_N N$  and  $D_K P_K K$  refer to the rates of depletion or exhaustion of natural agents of production, such as the using up of pools of oil, which do not apply to our simple theoretical case of  $N$  being Ricardian land and much more importantly,  $D_K P_K K$  refer to the rates of depreciation or using up of capital in production.

On the Expenditure side of the Accounts,  $P_C C$  are the values of the final consumption of the members of the society, which to many economists is the be all and end all of economics. The entries  $P_{K\Delta} K$  represent the values of the gross capital formation taking place in the society. It is gross in that no allowance is taken of the fact that the new capital goods being produced may or may not be sufficient to replace the wear and tear on existing capital goods.

The entries  $Y$  and  $E$  refer then to Gross National Income and Expenditure.

One of the major theoretical problems in classical and contemporary national income accounting is the meaning of capital<sup>9</sup> and the conception and measurement of ‘maintaining capital intact’. Even today despite advances in accounting and economic theory, it is difficult if not almost impossible empirically to measure well the ‘wear and tear’ on capital in modern economic systems. Where depreciation arises because of obsolescence, so severe are the problems of measurement

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government deficits to national income ratios to regulate membership in any collectivity of nation states.

<sup>9</sup> Professor Hulten states with respect to capital that “No issue has given economic theory more trouble, from Karl Marx and the Austrian capital theorists to Keynes and the Cambridge Controversies, and the ambiguity has only gotten worse with the increased theoretical focus on Schumpeterian uncertainty, partial information, imperfect competition, and the emerging literature on the importance of intangible capital assets.” Hulten, op. cit., 193.

that almost all economists today use Gross Domestic Expenditure or Income (Product) as the principal aggregate for economic analysis. National Income analysis then is greatly hampered by the fact that good estimates of capital consumption and the depletion of natural agents of production are not available.

If we did have such estimates, the National Accounts just set out could be revised further to appear as

$$\begin{array}{ccc}
 \text{WL} & & \text{PcC} \\
 \\
 \begin{array}{c} \text{RP}_K K \\ \text{RP}_N N \end{array} & & P_K [G - D]K = Pn_K K \\
 \\
 \hline
 Y^*N & \equiv & \hline
 E^*N
 \end{array}$$

where  $P_K [G - D]K = Pn_K K$  is net capital formation with  $n$  being the rate of growth so that one would be able to see how important were net returns to capital in net national income.

The importance of the capital problem extends to the measurement of labour income as well. Today, wages are paid not so much for the application of pure labour time but for the services of the human capital accumulated by the individuals through expenditures on education, health and even the raising of families. On such capital expenditures, though there is a direct link between the foregoing of present consumption and the accumulation of capital by the individuals, the difficulties of measuring the depreciation on intangible human capital in the so-called knowledge economies are as bad if not worse than for physical capital. Yet the problem of measuring the returns to human capital gripped the classical economists as well.

One could argue that the consumption of the workers was not final at all, but was perhaps just sufficient to maintain the labour force either at a particular level or at a certain growth rate. Suppose we could extend all of the capital measurement thinking previously outlined to the classical and modern neoclassical treatment of labour. We could write off the consumption of the workers as required inputs into the maintenance of the labour force. Much of PC would vanish along with WL. The above accounts could be then even further dramatically reduced to

$$\text{PcC}^*$$

$$\frac{RP_K K}{RP_N N}$$

$$P_K [G - D] K = P_K n K$$

≡

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$$Y^{**} N$$

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$$E^{**} N$$

where  $P_K C^*$  is the consumption of capitalists. The extreme classical Ricardian stationary state comes into focus. The economy converges to a position where savings and accumulation have been pushed to the point where  $R$ , the net rates of return are positive but so low that net savings and the rate of growth of net capital stock and national income,  $n$ , would be zero.

Though classical economists were aware that capital accumulation was unlikely to occur in given states of technology, the modern treatment of technical progress is to assume it serendipitously occurs or is, in fact, an endogenous function of the rate of capital accumulation. If, however, technical progress were steadily occurring, then the long period equilibrium of modern classical analysis would come into view. If the consumption of the capitalists were some function of their income and the rate of return so that  $PC^* = c[(R), RPK]$ , then national income for steady growth, the modern variant of the Ricardian stationary state, becomes

$$\begin{array}{lcl} RPK - c[(R)RPK] & \equiv & Pn'K \\ \text{or} & & \\ [1 - c[(R)]RPK] & \equiv & Pn'K \\ s(R)R & \equiv & n' \end{array}$$

that is, the economy converges to an equilibrium where rates of return to capital exceeds the rate of growth of the income of the economy arising from technical progress,  $n'$ , if the fraction of returns to capital saved,  $s$ , is less than one. If one assumes that the rate of technical progress is a function of the rate of capital accumulation, itself a function of expected  $R$ , in turn a function of actual  $R$ , then the whole structure of classical and neoclassical national income accounts can be boiled<sup>10</sup> down to

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<sup>10</sup> Readers **must** note that I am by-passing **severe** capital theoretic difficulties alluded to by Professor Hulten and severe problems in aggregation. His observation that "...all aspects of capital ultimately are derived from the decision to defer current consumption in order to enhance or maintain expected future consumption." (195) means that capital is not a factor of production independently of the 'willingness to wait' and that multifactor productivity advance should be conceived as the improvement in the efficiency of working and waiting,  $n'$ , rather than an

$$S(R)R = n'(R)$$

where the net rate of returns to capital, the intertemporal prices in modern economies, are seen by the simplest accounts to be a function of the rates of saving, or intertemporal choice, and rates of technical change, itself the product of investing and expected rates of return. Thus, we see that, when asking questions about the distribution of national income, the national accounts can be set out to illuminate the forces of growth which play vital roles in determining national income. It can also be seen that Ricardo's question about the determinants of the factoral distribution of national income lies at the very heart of modern economic analysis, both of the neoclassical and neo-Ricardian growth varieties<sup>11</sup> While economic theories may be said to generate the accounts designed to illuminate them, we have seen that they also illuminate the great theoretical difficulties associated with Professor Hulten's capital question.

### *Keynesian theory*

The Keynesian revolution clashed with classical and neoclassical theories and led to modern 'advances' in national income accounting. Indeed, some national accountants argue that, partly as a result of Keynes and other theorists such as Jan Tinbergen, modern national accounting started in the 1930s<sup>12</sup>. At the same time economic theory started paying increased attention to

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improvement in the efficiency of labour and capital. The deep theoretical questions involved in measuring the growth of nations and the aggregation questions may be resolved to some extent by the application of Leontief's disaggregated production and capital accumulation accounts. See, for instance, my "The productivity of working and waiting", eds. Philip Arestis et al., **Capital controversy, post-Keynesian economics and the history of economic thought**, London ; New York : Routledge, 1997. When one attempts to allocate capital by industry, problems associated with rented capital goods arise as well. For productivity measurement, should they be allocated to the lessee or lessor industry? Here is an example of where problems in national accounting condition economic theory. On these and related matters, see Alexandra Cas and Thomas K. Rymes, **ON CONCEPTS AND MEASURES OF MULTIFACTOR PRODUCTIVITY IN CANADA, 1961-81** (Cambridge: Cambridge University Press, 2006 tlinedigital paperback reprint of the 1991 original).

<sup>11</sup> For a version of the neoclassical variant, see Robert Barro and Xavier - L - Martin, **ECONOMIC GROWTH** (Toronto: McGraw Hill. 1995) [Special attention should be given to the chapter on growth accounting] and for a version of the neo- Ricardian variant, see Luigi Pasinetti, **STRUCTURAL CHANGE AND ECONOMIC GROWTH**.(Cambridge: Cambridge University Press, 1995)

<sup>12</sup> See Frits Bos, "The development of the Dutch national accounts as a tool for analysis and policy", *Statistica Neerlandica*, LX, 2006, 225. For an illustration that the Netherlands are one of the world's most advanced producers and users of national accounts, see Bos's doctoral dissertation *The National Accounts as a Tool for Analysis and Policy; Past, Present and Future* (2003:f.bos@cpb.nl

institutional forms such as corporations and governments. Under these influences, our simplified national accounts now appear as

$$\frac{WL}{\Omega} \equiv \frac{P_C C + P_{K\Delta} K}{E}$$

where the net returns to capital and net rents on natural agents of production are largely replaced by corporate profits,  $\Omega$ , which generally use measures of depreciation of limited economic meaning, and may or may not well reflect the distribution of interest to bondholders and dividends to shareholders with almost certainly no account being taken of capital gains and losses, and where the switch away from national income to gross national product reflected concern with unemployment rather than the level and the distribution of national income. When the revaluation accounts are added to the standard income accounts, theory again comes to the forefront.

Suppose that modern corporations distribute none of the profits or returns to capital they earn as dividends to their shareholders ( I ignore for simplicity the payment of interest to bondholders.) but reinvest their profits in the acquisition of capital goods for their firms. The value of the shares held by shareholders (and bought and sold among them) rise along with increases in the corporate stock of capital. It would appear from the national accounts as if the corporations did the saving whereas they may be used to test theories which have the corporations as mere intermediaries, whose investment decisions reflect the wishes of their shareholders

The neo-Ricardian and Keynesian theories can be put together for the determination of not just the level but also the distribution of national income. If good estimates of the wear and tear on capital are available, one can revert back from gross to net income and develop arguments addressed to the question of whether or not corporate firms and governments can affect the level and the distribution of national income. Here the national accounts can contribute to our knowledge of the extent to which individuals can be said to ‘see through’ corporate firms and governments in such matters as the Ricardian equivalence theorem.<sup>13</sup> To do this, the accounts must be prepared with various theories in mind for otherwise they may be dismissed with some derision by some contemporary theorists.<sup>14</sup>

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<sup>13</sup> For a discussion, using Canadian national income data, of whether governments with taxes, transfers and expenditure policies can affect the distribution of national income, see W. Irwin Gillespie, **Tax, Borrow and Spend: Financing Federal Spending in Canada 1867 - 1990** (Ottawa: Carleton University Press, 1991) and his **The Redistribution of Income in Canada** (Ottawa: The Carleton Library, 1980)

<sup>14</sup> See, for example, the remarks by Edward C. Prescott in his Nobel Lecture: “The Transformation of Macroeconomic Policy and Research”, **Journal of Political Economy**, MXIV,



When the personal distribution of national income is considered, national income accounts must be supplemented by longitudinal surveys of the distribution of income and wealth among individuals and families, the latter of which can be taken as representing constellations of individuals through time. Here again the theory of why certain families have such time preferences as to permit them to form dynasties requires much work if national income is to be so disaggregated so that those forces playing upon it may be extended to portray and understand individual and dynastic distributions of income and wealth.

*Controversies among modern monetary theories and national accounting.*

Recent developments in monetary theory offer great challenges to national accounting. Some monetary theories, those based fundamentally on the quantity theory of money, assert that changes in 'costless' fiat money cannot have effects on such real phenomenon as the distribution of national income. Yet, as national balance sheets and wealth accounts show, outside fiat monies is becoming increasingly marginal. How is national income affected by these matters?

National income reflects differences in the underlying classical, neoclassical and Keynesian theories. Keynesian models of unemployment rest upon the empirical and theoretical unimportance of outside or fiat money. Friedman argues, against the Keynesian position, that with real capital gains [losses] accruing to holders of money because of Keynesian disequilibria, real national income will tend to equilibrate at classical economic levels. Thus, if prices are falling because of unemployment, then according to Friedman the real income of people, holding given nominal amounts of outside fiat money, will be positive, and will rise faster and faster and become bigger and bigger the more quickly prices fall, thus causing the unemployment to vanish<sup>15</sup>. As monetary economies are characterized with less and less outside or fiat money, the less and less important is the Friedman counter to Keynes. The question which must be asked is: Is it meaningful to introduce capital gains and losses associated with deflations and inflations and the holding of fiat money into national income revaluation accounts when under modern monetary and central banking theory, such holdings, at least in the form of reserves with central banks, are vanishing?

The basic problem is that current national accounts is that we do not have meaningful measures of the output of private banks nor, even more importantly, of the output of central banks. Since the banks are the principal purveyors of transactions services, and therefore affect monetary production technologies, it follows that the inability of the national accounts to arrive at satisfactory measures of the output of banks means that they cannot measure satisfactorily production in monetary economies. Thus, though one of the central questions dividing Keynesian and

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April 2006, 203-235.

<sup>15</sup> Milton Friedman, *PRICE THEORY* (Chicago: Illinois, 1976), Chap. 13, 319-321. It is important to understand that Friedman's point, being basically theoretical, nonetheless throws open the question of the extent to which whether in a world where the traditional quantity theory of money remains valid, would national income measures be greatly affected by any capital gains and losses on the holdings of money?

neoclassical analyses and the effects of monetary developments on the concepts and measures of national income cannot be currently understood using the current national income accounts, even deeper questions emerge.<sup>16</sup> Does the growth of banks and central bank policies affect capital accumulation, technical progress and national income? We simply do not know now!

### *Conclusion*

The national income accounts have played central roles in the development of economic theory and analysis. Concepts and measures must be improved and developed to reflect better the fact that we live in monetary economies where we do not understand and do not accordingly measure well the outputs of banks and central banks, capital inputs, accumulation and technical progress, all which affect the distribution of national income. Ricardo's question still needs answers. Our current theories and measures of national income need work. Readers and students should therefore realize that there is much exciting and profitable theoretical and empirical study remaining to be done in national income accounting.

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9 October 2006

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<sup>16</sup> Indeed, if one applies to central banks procedures for the measurement of the output of banks recommended by the 1993 SNA and its various subsequent revisions, the output of central banks such as the Bank of Canada, when engaged in their principal central banking activity, will not be well captured by the National Accounts. I record my indebtedness to Kishori Lal, of Statistics Canada, for information provided on this point. The application of the SNA imputation for the measurement of the output of banks to modern central banks who have captured the idea of reserve-less central banking, results in such central banks having an output of ZERO for their principal activity, a clearly meaningless result. See my "Modern central banks only have *real* effects" eds. Marc Lavoie and Mario Seccareccia, **CENTRAL BANKING IN THE MODERN WORLD: An alternative perspective** (Cheltenham: Edward Elgar, 2004)

